CLAIMS

WE CLAIM:

1. A modular local coil system for magnetic resonance imaging comprising:

at least three electrically independent multiple loop coil elements sized to assemble along an axis so as to provide a substantially continuous field coverage of a patient along that axis;

cables and electrical connectors associated with each of the coil elements providing communications with the multiple loops of each coil element, respectively, the connectors receivable by a connector receptacle on an MRI machine whereby each coil element may be individually and directly connected to the MRI machine; and

a switch box providing coil-side connector receptacles receiving the connectors and an MRI machine-side cable and electrical connector receivable by the connector receptacle of the MRI machine, the switch box selectively connecting coil elements to the MRI machine;

whereby the coil sections may be used alone or in combination for different imaging requirements.

2. The modular local coil system of claim 1 wherein the switch box includes circuit paths connecting disabling signals to the coil elements that are not selectively connected to the MRI machine.

3. The modular local coil system of claim 1 wherein the coil elements include bases fitting against the upper surface of a patient table and abutting to align and space the coil elements from each other when assembled along the axis.

4. The modular local coil system of claim 1 wherein at least two of the coil elements, when assembled together include antenna structure from one coil fitting within a volume defined by antenna structure of a second coil.

5. The modular local coil system of claim 1 wherein at least one coil element is a head coil providing a volume for receiving a patient's head.

6. The modular local coil system of claim 1 wherein at least one coil element is a planar anterior coil fitting beneath the patient against a patient table.

7. The modular local coil system of claim 1 wherein at least one coil element is a pair of opposed anterior and posterior coils fitting about the patients upper torso.

8. A modular local coil system for magnetic resonance imaging comprising:

at least three electrically independent multiple loop coil elements coils sized to mechanically interfit along an axis so as to provide a substantially continuous coverage of a patient along that axis;

cables and electrical connectors associated with each of the coil elements providing communications with the multiple loops of each coil element, respectively;

a switch box providing coil-side connector receptacles receiving the connectors and a MRI machine side cable and electrical connector providing a connection receivable by a connector receptacle of the MRI machine, the switch box selectively connecting coil elements to the MRI machine;

wherein the switch box includes circuit paths connecting disabling signals to the coil elements that are not connected to the MRI machine.

9. The modular local coil system of claim 8 wherein the switch box includes circuit paths connecting disabling signals to the coil elements that are not selectively connected to the MRI machine.

10. The modular local coil system of claim 8 wherein the coil elements include bases fitting against the upper surface of a patient table and abutting to align and space the coil elements from each other when assembled along the axis.

11. The modular local coil system of claim 8 wherein at least two of the coil elements, when assembled together, include antenna structure from one coil fitting within a volume defined by antenna structure of a second coil.

12. The modular local coil system of claim 8 wherein at least one coil element is a head coil providing a volume for receiving a patient's head.

13. The modular local coil system of claim 8 wherein at least one coil element is a planar anterior coil fitting beneath the patient against a patient table.

14. The modular local coil system of claim 8 wherein at least one coil element is a pair of opposed anterior and posterior coils fitting about the patient's upper torso.

15. A modular local coil for magnetic resonance imaging comprising:

a head imaging element fitting against an upper surface of a patient table and sized to receive the head of a supine patient supported by the patient table to receive NMR signals therefrom;

a vascular imaging element fitting against the upper surface of a patient table and removably interfitting against an inferior end of the head imaging element to receive NMR signals from the neck and upper shoulder region of the supine patient;

a thoracic/lumbar imaging element fitting against the upper surface of a patient table and removably interfitting against an inferior end of the vascular imaging element to receive NMR signals from the thoracic and lumbar regions;

wherein internal loops of each of the head imaging element, the vascular imaging element, and thoracic/lumbar imaging element are constructed to provide isolation between the loop when the coils are interfitting and to provide reception of NMR signals in a continuous region from the head to the lumbar region.

16. The modular local coil of claim 15 wherein the vascular imaging element includes a mask portion extending into the head imaging elements and proximate to a lower portion of the patient head when the head imaging element and vascular imaging element are interfitting.

17. The modular local coil of claim 1 wherein the head imaging element provides a phased array coil set having eight independent channels.

18. The modular local coil of claim 15 wherein the vascular imaging element includes an anterior and posterior section above and below the supine patient, respectively.

19. The modular local coil of claim 18 wherein the anterior portion provides a phased array coil set having four independent channels.

20. The modular local coil of claim 15 wherein the posterior portion provides a phased array coil set having four independent channels.

21. The modular local coil of claim 15 including a switch system connecting each of the head imaging element, the vascular imaging element, and the thoracic/lumbar coil, one at a time to the MRI inputs.

22. The modular local coil of claim 15 wherein each of the coils includes active decoupling, detuning the coils when a decoupling current is received and, wherein the switch system connects those coils not connected to the MRI inputs to the decoupling current.